

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 25-44 and 46-50 are in the case.

I. THE ANTICIPATION REJECTIONS

Claims 25-26, 43-44 and 46 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Muskett (US 6,255,527). Claims 25-26, 43-44 and 46 are rejected under 35 U.S.C. §102(b) as allegedly anticipated by Watson *et al.* (US 5,831,120) (Watson). The rejections are respectfully traversed.

The present invention provides a process for the production of acetic acid. The process comprises reacting with carbon monoxide, methanol or a reactive derivative thereof in a liquid reaction composition comprising methyl acetate, a finite concentration of water, acetic acid and a catalyst system. The catalyst system requires all of the following:

- an iridium carbonylation catalyst,
- methyl iodide co-catalyst, and
- at least one non-hydrohalogenoic acid promoter.

It is noted that claim 1 requires a non-hydrohalogenic acid **promoter**. In other words, the nonhydrohalogenoic acid must be capable of promoting the iridium catalyst.

Muskett relates to a method of controlling the carbon monoxide flow to a reactor in a methanol carbonylation process for the production of acetic acid. In this method, the liquid reaction composition in the reactor comprises methyl acetate, a finite concentration of water, methyl iodide, a Group VIII noble metal catalyst, which may be

iridium, and optionally at least one promoter, which may be one or more of osmium, rhenium, ruthenium, cadmium, mercury, zinc, gallium, indium and tungsten.

The Action asserts (page 3) that the Muskett catalyst system comprises:

“...an Group VIII noble metal carbonylation catalyst (abstract and 4:21-22, where iridium is a Group VIII metal) methyl iodide cocatalyst, and at least one non-hydrohalogenoic acid promoter (abstract) selected from an oxoacid, a superacid, a heteropolyacid and mixtures thereof (4:21-22, **where the carboxylic acid is an oxoacid promoter**)...” (Emphasis added)

However, contrary to the above assertion, the carboxylic acid referred to in Muskett is a **product**, and does not promote the iridium carbonylation catalyst. Thus, the carboxylic acid is **not** an oxoacid promoter, as asserted in the Action. There is no disclosure in Muskett of a non-hydrohalogenoic acid iridium-catalyst promoter.

The presently claimed invention is clearly not anticipated by Muskett. Withdrawal of the anticipation rejection based on Muskett is respectfully requested.

Watson relates to a process for the production of acetic acid by the carbonylation of methanol, wherein the liquid reaction composition comprises a Group VIII carbonylation catalyst, which may be iridium, methyl iodide co-catalyst, optionally at least one promoter, which may be selected from the group consisting of ruthenium, osmium, cadmium, rhenium, zinc, mercury, gallium, indium and tungsten, at least a finite concentration of water, methyl acetate and acetic acid product.

The Action asserts (page 3) that the Watson catalyst system comprises:

“...an iridium carbonylation catalyst (6:29-30), methyl iodide co-catalyst (9:64), and propionic acid (6:47, **where propionic acid is an oxoacid**).” (Emphasis added)

However, the propionic acid formed in the reaction composition of Watson is a by product. Contrary to the assertion in the Action, the propionic acid does not promote an iridium carbonylation catalyst and is therefore **not** an iridium catalyst promoter. There is no disclosure of a non-hydrohalogenoic acid iridium-catalyst promoter in Watson.

The presently claimed invention is clearly not anticipated by Watson. Withdrawal of the anticipation rejection based on Watson is respectfully requested.

II. THE OBVIOUSNESS REJECTIONS

Claims 27-29 and 32-37 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over either Muskett or Watson in view of Vanderpool *et al.* (US 4,629,809) (Vanderpool). Claims 38-42 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over either Muskett or Watson in view of Tokumoto *et al.* (US 5,166,419) (Tokumoto). Claims 27-29 and 32-35 are rejected under 35 U.S.C. §103(a) as allegedly unpatentable over either Muskett or Watson in view of Vanderpool and further in view of Tokumoto. The rejections are respectfully traversed.

As noted earlier, the claimed invention provides a process for producing acetic acid by reacting with carbon monoxide, methanol or a reactive derivative thereof in a liquid reaction composition comprising methyl acetate, a finite concentration of water, acetic acid and a catalyst system. The catalyst system requires an iridium carbonylation catalyst, methyl iodide co-catalyst, and at least one non-hydrohalogenoic acid promoter.

The problem addressed by the present invention is the need for an improved rate of carbonylation in an iridium-catalyzed, methyl-iodide co-catalyzed carbonylation

process for the production of acetic acid (specification, page 2, lines 3-51). The present invention solves this problem by using a non-hydrohalogenic acid promoter in the catalyst system of the carbonylation process.

It is known that in the iridium-catalyzed carbonylation of methanol, hydroiodic acid is generated, and as the concentration of hydroiodic acid is increased, the rate of carbonylation decreases. The discovery according to the present invention that the concentration of protons (H^+) in the carbonylation system can be increased without having a detrimental effect on the carbonylation rate is therefore surprising (page 2, lines 6-13), and could not have been predicted by one of ordinary skill in the art as of the filing date of application.

Muskett and Watson disclose the use of "conventional" iridium catalyst metal promoters such as ruthenium, osmium and rhenium. Neither Muskett nor Watson suggests the use of a non-hydrohalogenoic acid as an iridium catalyst promoter, as required by the presently claimed process. Certainly, one of ordinary skill could not have predicted, based on Muskett and Watson, the improved rates noted above. The claimed invention is therefore not rendered unpatentable by Muskett and Watson.

Vanderpool does not give rise to a *prima facie* case of obviousness of the claimed process, taken alone or in combination with Muskett and Watson. Vanderpool describes a process for producing acetic acid by reacting methanol with carbon monoxide in the presence of an iodine-free catalyst system, wherein the catalyst consists of ruthenium compound, quaternary phosphonium salt, cobalt-compound, an inorganic acid or an organic acid, reacted in combination in a liquid form or a catalyst of ruthenium on an inert solid support with a sulfur-containing acid promoter.

Vanderpool does not relate to an iridium-catalyzed methanol carbonylation process. Further, Vanderpool discloses that the use of iodides is disadvantageous (col. 3, lines 6-18). Thus, one of ordinary skill in the art would not have been motivated to rely on Vanderpool, and actually would have been lead **away** from the present invention which requires the presence of a methyl-iodide co-catalyst. In other words, when looking to improve the rate of carbonylation in an iridium catalyzed, methyl iodide co-catalyzed carbonylation process for the production of acetic acid, the person of ordinary skill, as of the filing date of the present case, would have had no incentive to consult Vanderpool since it leads away from the use of methyl iodide. One of ordinary skill would, therefore, not have been motivated to combine Muskett, Watson and Vanderpool in the context of the present invention. Withdrawal of the obviousness rejection of claims 27-29 and 32-37 over Muskett or Watson in view of Vanderpool is respectfully requested.

Referring to the obviousness rejection of claims 38-42 over Muskett or Watson in view of Tokumoto, Tokumoto relates to a method for preparing a-(4-isobutylphenyl)propionic acid. There is no disclosure or suggestion in Tokumoto of a methanol/reactive derivative thereof carbonylation process. In fact, Tokumoto is not concerned with the production acetic acid. Thus, when looking to improve the rate of carbonylation in an iridium catalyzed, carbonylation process for the production of acetic acid, one of ordinary skill would not have been motivated to consult Tokumoto, since Tokumoto relates to a completely different reaction. Withdrawal of the obviousness rejection of claims 38-42 over Muskett or Watson in view of Tokumoto is respectfully requested.

With regard to the obviousness rejection of claims 27-29 and 32-35 over Muskett or Watson in view of Vanderpool and further in view of Tokumoto, based on the above discussion, it is clear that no combination of Muskett, Watson, Vanderpool and/or Tokumoto would have lead the person of ordinary skill to the presently claimed process. Withdrawal of the obviousness rejection of claims 27-29 and 32-35 over Muskett or Watson in view of Vanderpool and further in view of Tokumoto is respectfully requested.

III. AMENDMENT

Claim 1 has been amended to improve its form. No new matter is entered.

Favorable action is awaited.

Respectfully submitted,

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